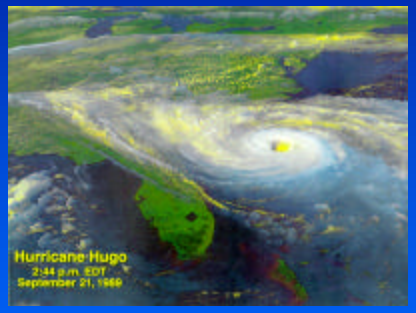
EFFECTS OF HURRICANE HUGO ON WOOD PROPERTIES OF LOBLOLLY PINE 10 YEARS AFTER STORM



ABSTRACT

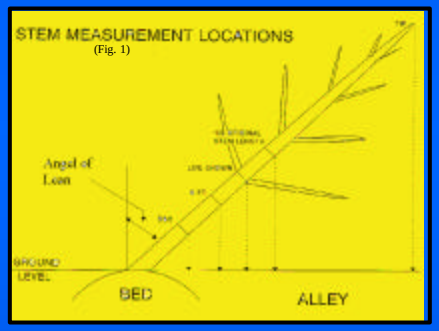
The effect of hurricane-induced tree lean on wood properties of loblolly pine 10 years after Hurricane Hugo was evaluated. The effect on tree age at storm (2,4 & 8 years) and degree of lean (0-5,6-25,26-45,>45) on compression wood formation, toughness, specific gravity and moisture content was determined. Lean induced compression wood was 21% lower in toughness and 2% higher in specific gravity compared to clear wood. Results indicate that the proportion of stem in compression wood increases significantly with age at storm in trees with lean > 25 degrees. Thus, trees ^{3} 8 at storm with > 25 degrees lean should be harvested and replanted immediately after storm

OBJECTIVES

- DETERMINE THE EFFECT OF ANGLE OF LEAN AND TREE AGE AT STORM ON:
  - COMPRESSION WOOD CONTENT
  - WOOD SPECIFIC GRAVITY
  - WOOD MOISTURE CONTENT
  - WOOD TOUGHNESS
- DEVELOP OPERATIONAL GUIDELINES FOR DETERMINING FUTURE STATUS OF DAMAGED PLANTATIONS

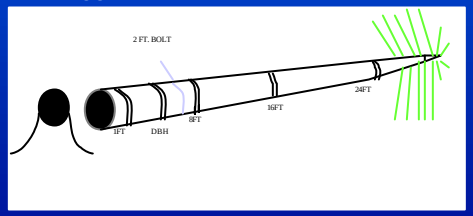
PROCEDURES

- ONE YEAR AFTER HUGO 12 TREES FROM EACH OF FOUR LEAN CLASSES (0-5, 6-25, 26-45 >45 DEGREES) AND THREE LOBLOLLY PINE STANDS ON THE SOUTH CAROLINA COASTAL PLAIN REPRESTING AGE CLASSES 2, 4 AND 8 YEARS AT STORM WERE MEASURED (FIG 1.)
- STUDY TREES WHERE REMEASURED 2, 4 , 6 AND 10 YEARS AFTER HUGO.
- 10 YEARS AFTER HUGO STUDY TREES WERE FELLED AND SAMPLED TO DETERMINE WOOD SPCIFIC GRAVITY, MOISTURE CONTENT, COMPRESSION WOOD CONTENT AND TOUGHNESS (FIG 2)



10 YEARS AFTER STORM FELLED TREE SAMPLE PROCEDURE (FIG.2)

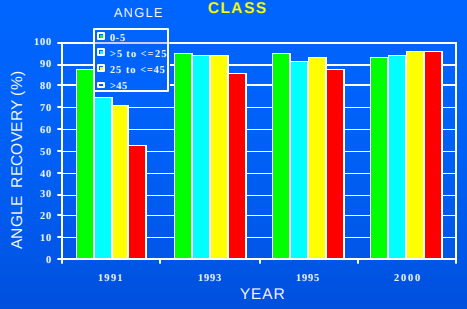
1. CUT TWO 1-INCH CROSS SECTION AT 1.0FT, DBH, 8 FT & 8 FT INTERVAL TO 2-IN DOB TOP
2. ONE DISK FOR MC & SP.GR. ANALYSIS
3. ONE DISK FOR COMPRESSION WOOD ANALYSIS
4. CUT 2 FT BOLT AT 6-8 FT FOR TOUGHNESS ANALYSIS



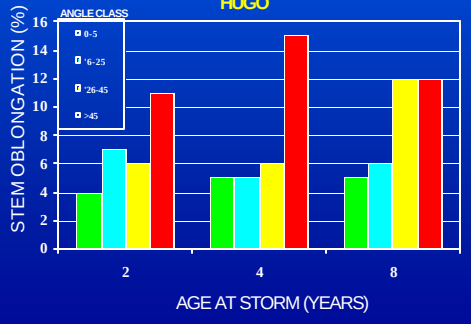
NUMBER OF TREES SAMPLED AND AVERAGE DBH AND TOTAL HEIGHT 1 YEAR AFTER STORM BY AGE AT STORM AND ANGLE CLASS FOR LOBLOLLY PINE DAMAGED BY HURRICAN HUGO

CHARACTERISTICS	ANGLE CLASS (DEGREES) 0-5	6-25	26-45	>45
		AGE 2 AT STORM		
SAMPLE TREES (NO)	12	12	12	12
DBH (IN)	(0.5) 6.3	(0.6) 7.4	(0.5) 6.2	(0.7) 5.7
TOTAL HEIGHT (FT)	(5) 44	(6) 48	(4) 43	(3) 41
		AGE 4 AT STORM		
SAMPLE TREES (NO)	12	12	12	12
DBH (IN)	(3.3) 7.6	(2.7) 7.0	(2.2) 6.5	(2.0) 5.5
TOTAL HEIGHT (FT)	(17) 58	(15) 54	(11) 52	(7) 47
		AGE 8 AT STORM		
SAMPLE TREES (NO)	12	12	12	1
DBH (IN)	(6.4) 9.1	(7.0) 10.0	(6.4) 8.4	(4.6) 5.5
TOTAL HEIGHT (FT)	(34) 55	(36) 57	(24) 49	(19) 40

PROPORTION OF TREE ANGLE RECOVERY 2, 4, 6, AND 10 YEARS AFTER STORM BY ANGLE CLASS



AVERAGE PROPORTION OF STEM OBLONGATION BY AGE AT STORM AND ANGLE CLASS FOR LOBLOLLY PINE 10 YEARS AFTER HURRICANE HUGO



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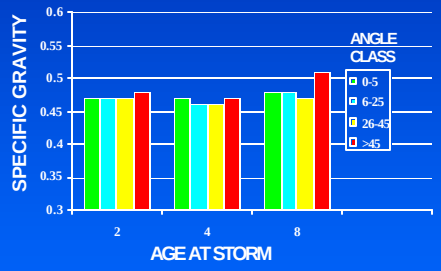
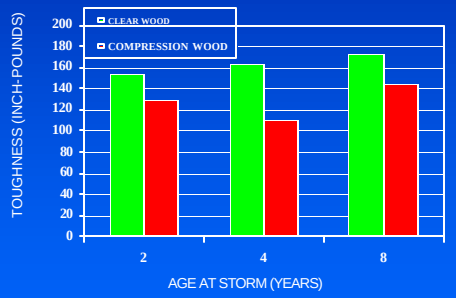
AVERAGE WOOD SPECIFIC GRAVITY BY AGE AT STORM AND ANGLE CLASS FOR LOBLOLLY PINE 10 YEARS AFTER HURRICANE HUGO



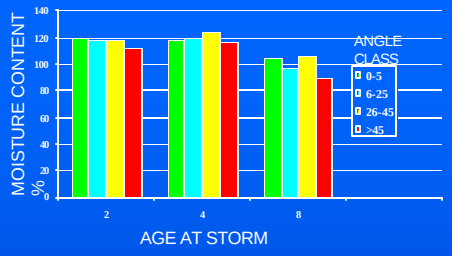
AVERAGE TOUGHNESS OF CLEAR WOOD COMPARED TO COMPRESSION WOOD FOR SAMPLES CUT FROM LOBLOLLY PINE 10 YEARS AFTER HURRICANE HUGO BY AGE AT STORM



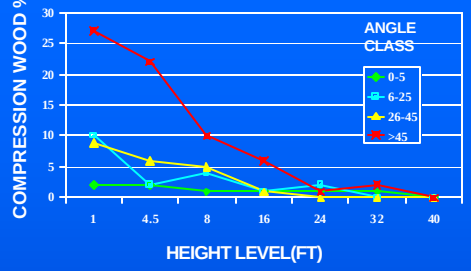
CONCLUSIONS

- ANGLE OF TREE LEAN DID NOT SIGNIFICANTLY EFFECT STEM WOOD SPECIFIC GRAVITY OR MOISTURE CONTENT.
- AVERAGE COMPRESSION WOOD SPECIFIC GRAVITY WAS SLIGHTLY HIGHER (2%) THAN THAT OF NORMAL WOOD
- TOUGNESS OF COMPRESSION WOOD AVERAGED 21 % LOWER THAN THAT OF NORMAL WOOD
- PROPORTION OF STEM IN COMPRESSION WOOD INCREASED SIGNIFICANTLY WITH INCREASING TREE AGE AT STORM IN TREES WITH > 25 DEGREES LEAN

AVERAGE WOOD MOISTURE CONTENT BY AGE AT STORM AND ANGLE CLASS FOR LOBLOLLY PINE 10 YEARS AFTER HURRICANE HUGO

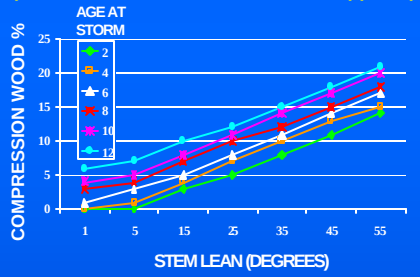


AVERAGE PROPORTION OF DISK BASAL AREA IN COMPRESSION WOOD 10 YEARS AFTER HURRICANE HUGO BY STEM HEIGHT AND ANGLE OF LEAN FOR LOBLOLLY PINE AGE 4 AT STORM

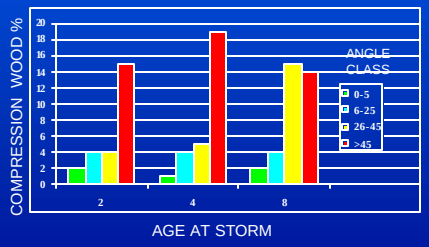


PREDICTED PROPORTION OF STEM IN COMPRESSION WOOD 10 YEARS AFTER STORM BY DREGREE OF LEAN AND AGE AT STORM

(Y= -3.110 + 0.702 * STORMAGE + 0.285 * LEAN) (R2=.53)



AVERAGE PROPORTION OF STEM IN COMPRESSION WOOD BY AGE AT STORM AND ANGLE CLASS FOR LOBLOLLY PINE 10 YEARS AFTER HURRICANE HUGO



AVERAGE PROPORTION OF DISK BASAL AREA IN COMPRESSION WOOD 10 YEARS AFTER HURRICANE HUGO BY STEM HEIGHT AND ANGLE OF LEAN FOR LOBLOLLY PINE AGE 8 AT STORM